

Patent claims

1. Commutator arrangement for a small electric motor,

5 with a capacitor ring disk consisting of several capacitor elements,

wherein the capacitor ring disk is made of a dielectric first ring disk (RS),

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on whose upper side several sector-shaped electrode layers (6) are positioned,

wherein each of the electrode layers (6) is electrically con-
15 ductively connected with a commutator segment (13),

and wherein counter electrodes of the capacitor element are provided on an underside located opposite the upper side,

20 characterized in that

a single underlying counter electrode layer (4) is provided which underlies and almost covers the electrode layers (6) so that the counter electrodes of all capacitor elements have
25 the same potential.

2. Commutator arrangement as defined in claim 1, wherein a plurality of capacitor ring disks are laminated on top of one another with a dielectric layer (15) in between like a multi-
30 layer capacitor.

3. Commutator arrangement as defined in one of the preceding claims, wherein the capacitor ring disks are laminated one on

top of the other so that the electrode layers (6) are essentially located congruently over each other.

4. Commutator arrangement as defined in one of the preceding
5 claims, wherein the capacitor elements created by the electrode layers (6) stacked on top of each other are contacted together to create a capacitive element and are each connected with a commutator segment (13).
- 10 5. Commutator arrangement as defined in one of the preceding claims, wherein the electrode layers (6) placed on top of one another are contacted with each other on an exterior circumference surface of the first ring disk (RS).
- 15 6. Commutator arrangement as defined in one of the preceding claims, wherein the counter electrode layer (4) is round and extends up to an interior circumference of the first ring disk (RS).
- 20 7. Commutator arrangement as defined in one of the preceding claims, wherein the counter electrode layer (4) is formed as resistance layer with a resistance in the range from 0.1Ω to $1 \text{ K}\Omega$.
- 25 8. Commutator arrangement as defined in one of the preceding claims, wherein at least one inductor is connected before or after each capacitor element or each capacitive element in series.
- 30 9. Commutator arrangement as defined in one of the preceding claims, wherein at least one discrete inductor is connected before or after each capacitor element or each capacitive element in series.

10. Commutator arrangement as defined in one of the preceding claims, wherein a second ring disk made of a highly permeable magnet material is provided for which each of the
5 inductors is formed by a conductive structure placed thereon, and wherein each of the capacitances is electrically conductively connected with one of the inductors.
11. Commutator arrangement as defined in one of the preceding
10 claims, wherein at least one resistance is connected before or after each capacitor element or each capacitance in series.
12. Commutator arrangement as defined in one of the preceding
15 claims, wherein the resistance has a non linear U/I characteristic curve.
13. Commutator arrangement as defined in one of the preceding claims, wherein the resistances are designed in one piece
20 in the form of a third ring disk or as a further resistance layer placed on a ring disk or on the electrode layer (6) or the counter electrode layer (4).
14. Commutator arrangement as defined in one of the preceding
25 claims, wherein the second and/or the third ring disk (16) or resistance layer form a laminate (L) with the capacitor ring disk(s).
15. Commutator arrangement as defined in one of the preceding
30 ing claims, wherein a supporting disk (11) made of ceramic is provided for the retention of the capacitor or the laminate (L).

16. Commutator arrangement as defined in one of the preceding claims, wherein the capacitor ring disk(s) or the laminate (L) are connected with a commutator sleeve (12) supporting the commutator segments (13).

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17. Commutator arrangement as defined in one of the preceding claims, wherein the capacitor ring disk(s) or the laminate (L) is surrounded by the commutator segments (13).

10 18. Small electric motor with a shaft and a commutator arrangement mounted thereon as defined in one of the preceding claims.